User Manual R1.0
CO2Meter, Inc.
TecPen 0-5% O2
TS-200

TS-200

Safety and security

General safety instructions

- Before operating this device, read the operating instructions very carefully and keep them in a safe place.
- Use the device exclusively for commercial use and the intended purpose. This device is not intended for personal use. Do not use it outdoors (unless it is intended for conditional outdoor use). Keep it away from heat, direct sunlight, moisture (never immerse in liquid) and sharp edges. Do not use the device with wet hands. If the device has become damp or wet, switch off the device immediately and, if connected, disconnect the mains plug from the power supply. Don't reach into the water.
- Always turn off the appliance and unplug the appliance from the wall outlet (pull the plug, not the cable) when not in use, attaching accessories, for cleaning or in case of malfunction.
- Check the device and cable regularly for damage. Do not put a damaged device into operation.
- Do not repair the device yourself, but visit an authorised specialist company. In order to avoid hazards, only have the defective device or power supply replaced or exchanged by the manufacturer or our customer service.
- Only use original accessories.
- The device must not be opened during operation.
- Never immerse the device in water or other liquids.
- The device must be kept out of the reach of children.
- Do not fill with solvents, alcohol or cleaning agents, you may damage the device.
- If the device is brought into a room with a large temperature difference to the environment, an acclimatization period of 1-2 hours should be observed.
- Protect the device from dirt.
- Never store the cannula without protection.
- Be careful when using the cannula. Risk of injury!
- Never drop the appliance from a great height.
- The device is designed for the invasive measurement of closed containers. The object to be measured is subsequently damaged and must not be reused.

warning symbols

Warnings can be classified according to the extent of a hazardous situation. The classification is based on an assumption as to how probable the occurrence of a hazardous situation is and what consequences are associated with it.

There are four classes of warnings.

Danger!

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ Warning!

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ Watch it! Watch it!

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor injury.

Watch your step!

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in machinery damage.

ℹ reference

This symbol draws your attention to important, useful and helpful information.

purpose of use

Measurement of O_2 content in all closed and pierceable containers:
- In food packaging with protective gas atmosphere (MAP packaging)
- In the head space of vials, cell culture vessels, infusion containers, syringes
- In micro-bioreactors

modifications

disclaimer

The device may not be modified, neither in terms of its construction nor with regard to the safety devices, without the express consent of CO2Meter. CO2Meter is not liable for damage resulting from unauthorized modifications.
The operator must obtain the opinion of the manufacturer in order to make significant modifications. As manufacturers, they have the legal responsibility for all these measures. Accordingly, the original manufacturer is released from his liability.

original parts

Only original CO2Meter parts and accessories are to be used. Original parts and original accessories from CO2Meter promote safety. CO2Meter is not liable for damage caused by the use of other parts or as a result of unauthorized modifications.
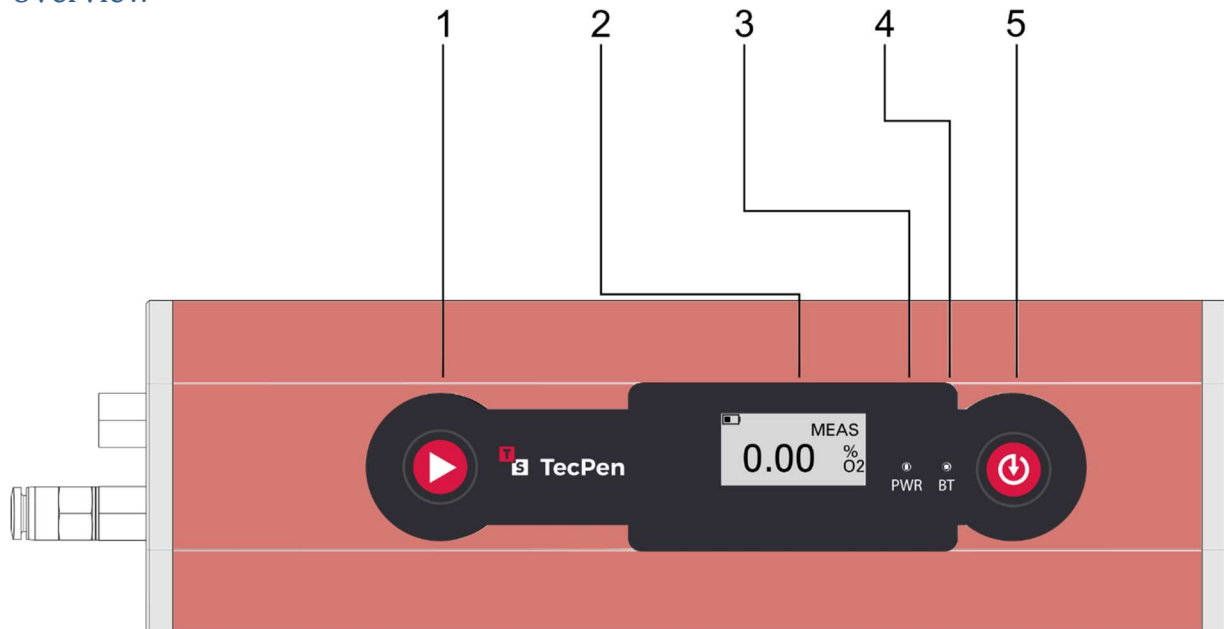
Other Support Information

If you have any further questions about the device or spare parts, please contact us:

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Ormond Beach, FL 32174 USA
Tel. 877-678-4259
Sales@CO2Meter.com
www.CO2Meter.com

Description (structure and function)

Overview

1	start button
2	OLED display
3	PWR (Power) LED
4	BT (Bluetooth) LED
5	memory button
6	on/off button
7	USB port
8	Sampling gas inlet
9	gas outlet

Operating principle

The principle of opto-chemical oxygen detection using TecPen TS-200 is based on the different emission
of fluorescent radiation from the fluorescent dye depending on the oxygen concentration. The dye is excited and the resulting fluorescence event is absorbed. The duration of this fluorescence event - the so-called lifetime - depends on the amount of adsorbed oxygen in the sensor layer and can therefore be used to determine the oxygen concentration.

Technical data

TS system	TecPen
measuring range	0,0-5,0%
precision	
Range 0.0-0.5%	+/- 0,01%
Range 0.5-1.0% 0.5-1.0% 0.5-1.0	+/-0,03%
Range 1.0- 5.0%	+/-0,05%
Response time at 25°C	<150ms
maximum pressure	10 bar
Temperature range+ Min./Max.	-10°C / +50°C
medium	gaseous, no solvents
power supply	Battery, charged via USB
data interface	USB and BT4.0 via Android
withdrawal volume	< 5ml
temperature compensation	yes, 10 to 30°C
pressure compensation	n.a.
evaluation	128x64 OLED display
industry certificates	on request
cleaning	no organic solvents70% ethanol
	Needle stainless steel
Wetted parts	St.1.4404
degree of protection	IP54
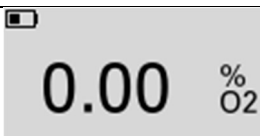
software description

In normal use, the TecPen has 5 screens that can be recalled by pressing and holding the memory button. 🔵 It is not possible to switch through the screens in reverse order.

ℹ️ **reference**

Zero-point adjustment may only be carried out by CO2Meter Service.

Screen 1 main screen		battery level measured value Temporary: Memory/Log Indicator Indicator for current measurement

	LOG 0.00 % O2 MEAS 0.00 % O2	
Screen 2 recipe administration	1234 Produktname 1234567891234	Consecutive / internal number product name EAN code
Screen 3 Date & Time	2018-01-01 12:12:12	date time
Screen 4 measurement data display	Ampl.[lsb]: 0 Tau[us]: 0.00 Temp.[°C]: + 0.0	amplitude life temperature
Screen 5 info screen	Device info: TPV3DD20180 605IMTN001 Device state: 0	serial number device status code

Additional screen Zero point adjustment	Recalibration 0%? <u>NO</u>	Selection option YES / NO

operation

Settings before start of production

All products/recipes are entered in the supplied Excel file and can be exported as CSV files using the built-in macro. This CSV file is stored on the internal memory of the TecPen and can be retrieved after a restart of the device. To connect the unit to the computer, follow the same procedure as described in "Recalling Saved Data".

Watch your step!

Before disconnecting the USB connection, the TecPen must be ejected properly to avoid damaging the file system. If this should happen, all data still on the device will be irretrievably lost.

Before starting the measurement, the hose and filter must be attached to the instrument to prevent contamination of the gas chamber. To do this, place the hose on the gas inlet (8) and fasten the filter on the other side of the hose. The cannula is then placed on the front of the filter.

Watch your step!

The back of the filter has a luer lock closure. This must be turned into the intended connection of the hose for proper installation.

⚠ Watch it! Watch it!

The cannula may only be mounted with the protective cap on, as there is a considerable risk of injury.

Operation

commissioning

Press the On/Off button 🔵 to turn on the unit. The TecPen shows the battery status and an oxygen value of 0.00%. This is a placeholder and not an actual measurement result.

The unit can be switched off by pressing the On/Off button 🔵 for at least two seconds.

Start measurement

The cannula is used to puncture the packaging to be measured. Briefly press the start button to 🔵 start a measurement. The measurement is automatically terminated after 10 seconds. If the measuring time is to be extended, the start button 🔵 can be pressed again after the measurement has been completed and the instrument measures a further 10 seconds.

⚠ Watch it! Watch it!

After the measurement has been completed, the protective cap must be placed back on the cannula to avoid injury.

Save

After the measurement has been completed, the currently displayed measured value can be stored in the internal memory of the TecPen by briefly pressing the memory key. 🔵 For each day on which measurements are taken, a separate file is created in which the measured values are stored with a time stamp.

Select recipe

In addition to the time stamp, a recipe/product can be selected for which the name, sequence number and EAN code are also stored with therespective measured value. To do this, press and hold the memory key 🔵 longer; a new screen appears with the saved recipes. With the memory key 🔵 you can scroll down through the list, with the start 🔵 button you can scroll up. The desired recipe can be confirmed by pressing and holding the memory key 🔵. The screen automatically switches to the measuring mode. (Refer to section XX Settings Before Production Starts for instructions on how to load recipes into the unit beforehand).

> **ℹ️ reference**

How recipes can be loaded into the device in advance is described in the section Settings before starting production.

Setting the date and time

By pressing the memory button 🔵 for 2 seconds the screens are changed. Switch to the date and time screen. To change the set data, first press the start button ▶️ for 2 seconds; the year is underlined. As with recipe selection, the memory button 🔵 scrolls down and the start button ▶️ scrolls up. If the year has been set correctly, this is confirmed by pressing the start button for ▶️ 2 seconds and the next field is highlighted. The procedure is the same until all fields have been set correctly. Press the memory button 🔵 for 2 seconds to confirm and save the setting.

Retrieving stored data

The stored measured values can be retrieved by connecting the TecPen to a computer via USB cable when it is switched on. The data can be transferred to the computer like from a USB stick.

> ## Watch your step!

Before disconnecting the USB connection, the TecPen must be ejected properly to avoid damaging the file system. If this should happen, all data still on the device will be irretrievably lost.

zero adjustment

In order to adjust the zero point, a gas volume with overflow must be pierced and purged with nitrogen. At short intervals, the start button and then ▶️ the memory button are 🔵 pressed and held. The pump is activated and a screen appears with the text "Recalibration 0%?" followed by "NO". By briefly pressing one of the two keys or ▶️ , you 🔵 can switch between "YES" and "NO". If "NO" is selected, the operation is aborted by pressing and holding the memory key 🔵 . If "YES" is selected, wait for at least 5 minutes to perform a correct adjustment. Then press and hold the memory key to 🔵 confirm.

> ## Watch your step!

The adjustment may only be carried out with class 5.0 or purer nitrogen, otherwise the quality of the measurement results cannot be guaranteed.

> ## Watch your step!

With a zero-point adjustment, the original calibration values are overwritten. If the adjustment has not been carried out correctly, the original values can only be restored by the manufacturer support.

cleaning

The unit can be cleaned externally with isopropanol and a fine, soft cloth.
Never immerse the device in water or other liquids.

Do not clean the unit with ultrasonic cleaner.
Do not fill with solvents, alcohol or cleaning agents, they may damage the device.

maintenance

maintenance instructions

The instrument must be returned annually to the manufacturer for recalibration in accordance with ISO:9000 certification.

fault diagnosis

Malfunctions or alarm messages

0 normal   operation
1 UART   buffer overrun
2 Temperature sensor error
4 SD card   not recognized

Watch your step!

If the TecPen TS-200 displays one of the error codes mentioned, switch off the device and contact the manufacturer immediately.

Scope of delivery

number	designation	spare part number
1	TecPen	
1	belt bag	
2	particulate filters	TS R1 HH 001
2	Cannula 25/0.8	TS R1 HH 008
1	USB cable	TS R1 HH 003
1	USB protection cover	TS R1 HH 004
1	USB flash drive	
1	instruction manual	
12	septum	TS R1 HH 006
1	Flexible extension	TS R1 HH 007
1	calibration certificate	
	DIN ISO Service	TS R1 HH 009